REMARKS

Claims 95, 96, and 117 were pending. Claims 1-94 and 97-116 are withdrawn from consideration as directed to non-elected inventions.

Upon entry of this amendment claims 95, 96, and 117 will be pending.

No new matter has been added.

Rejection under 35 U.S.C. § 101

Claims 96, 96, and 117 remain rejected under 35 U.S.C. § 101 because allegedly the claimed invention is drawn to an invention with no apparent or disclosed specific and substantial credible utility. Applicants respectfully disagree.

Utility Examination Guidelines

The Utility Examination Guidelines require a claimed invention have a specific, substantial and credible asserted utility, or, alternatively, a well-established utility. As Applicants have asserted utilities that are specific, substantial and credible, and well established, the Utility Requirement has been satisfied. Applicants therefore respectfully request the withdrawal of the rejection under 35 U.S.C. § 101.

To meet the utility requirement, the invention must be "practically useful," *Anderson v Natta*, 480 F.2d 1392, 1397 (CCPA 1973) and confer a "specific benefit" on the public. *Brenner v. Manson*, 383 U.S. 519, 534 (1966). The threshold of utility under this standard is not high, and requires merely an "identifiable" benefit. *Juicy Whip Inc. v. Orange Bang Inc.*, 51 USPQ2d 1700 (Fed. Cir. 1999). In *Stiftung v. Renishaw PLC*, 945 F.2d 1173, 1180 (Fed. Cir. 1991), the CAFC explained that "An invention need not be the best or only way to accomplish a certain result, and it need only be useful to some extent and in certain applications: "[T]he fact that an invention has only limited utility and is only operable in certain applications is not grounds for finding lack of utility." *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 762, 221 USPQ 473, 480 (Fed. Cir. 1984).

Inventions that achieve a practical use, a use that is also achieved by other inventions, satisfy the utility requirement. Thus practical utilities can be directed to

classes of inventions, so long as a person of ordinary skill in the art would understand how to achieve a practical benefit from knowledge of the class. *Montedison*, 664 F.2d at 374-75. For example, many materials conduct electricity. This general utility applies to a broad class of inventions (conductive materials) and satisfies the utility requirement of section 101. The fact that other materials also conduct electricity does ***not*** mean that other materials that conduct electricity want for utility. What is important, however, is that ion channels are known to have practical uses well beyond throwaway uses like snake food.

Practical uses for ion channel antibodies include therapeutic and diagnostic uses as well as research-based uses. Many medically significant biological processes are mediated by signal transduction pathways involving ion channels and are recognized as important therapeutic targets for a wide range of diseases. Thus, the allegation that there is no well established utility for proteins of the class that the Applicants are now claiming is directly refuted by industry evidence.

The Office appears to be under the mis-impression that inventions that are, *inter alia*, useful for use in research are unpatentable. This is simply not true. The Patent Office's patent database is replete with patents claiming useful research tools, *e.g.*, spectrophotometers. A material whose only use is as a tool in research may indeed be patentable. *Brenner* excludes only those research purposes where the ***only*** use of the material itself is as the subject of research. If *Brenner* had held otherwise, any chemical material would, by virtue of its existence, be useful. However, nowhere do those cases state or imply that a material cannot be patentable if has some other beneficial use in research.

Assay methods, like many other tools used in research, have an immediately realizable "real world" value. For example, an assay method that can identify chemical compounds that possess a particular physical, structural or biological property clearly has "real world" value irrespective and independent from the utility that may be associated with the compounds identified using the assay method. As a consequence, a presumption that assay methods cannot possess utility if the compound isolated or identified using the

assay do not have utility would be the product of a flawed analysis of *Brenner*. Such a conclusion also would suggest that processes and products can never possess utility if their utility lies in the field of research. Indeed, the application of this concept of the utility requirement as it relates to methods for assaying or identifying compounds, if taken literally, would mean that claims to methods such as NMR, infrared, x-ray crystallography, and screening for other important biological properties, would be unpatentable because further research would be necessary to establish utility for the compounds identified or assayed. This certainly cannot be the result intended by the Patent Office when issuing these guidelines.

Antibodies specific for ion channels can also be used, for example, to study protein expression and localization, even in cases where little is known as to how a particular ion channel works. No additional experimentation would be required, therefore, to determine whether an ion channel has a practical use as all ion channels have at least one practical use.

Because all ion channels, as a class, convey practical benefit (much like the class of DNA ligases identified in the Training Materials), there should be no need to provide additional information about them. A person of ordinary skill in the art need not guess whether any given ion channel conveys a practical benefit. Nor is it necessary to know how or why any given ion channel works. It is settled law that how or why any invention works is irrelevant to determining utility under 35 U.S.C. §101: "[I]t is not a requirement of patentability that an inventor correctly set forth, or even know, how or why the invention works." *In re Cortwright*, 165 F.3d 1353, 1359 (Fed. Cir. 1999)(quoting *Newman v. Quigg*, 877 F.2d 1575, 1581 (Fed. Cir. 1989).

Applicants need only prove a "substantial likelihood" of utility; certainty is not required. *Brenner*, 383 U.S. at 532. The amount of evidence required to prove utility depends on the facts of each particular case. *In re Jolles*, 628 F.2d 1322, 1326 (CCPA 1980). "The character and amount of evidence may vary, depending on whether the alleged utility appears to accord with or to contravene established scientific principles and beliefs." *Id.* Unless there is proof of "total incapacity," or there is a "complete

absence of data" to support the applicant's assertion of utility, the utility requirement is met. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571 (Fed. Cir. 1992); *Envirotech*, 730 F.2d at 762. The Office has failed to provide proof of "total incapacity", and Applicants have provided information that supports the asserted utilities.

The Office is also reminded that a patent applicant's assertion of utility in the disclosure is presumed to be true and correct. *In re Cortwright*, 165 F.3d at 1356; *Brana*, 51 F.3d at 1566. If such an assertion is made, the Patent Office bears the burden in the first instance to demonstrate that a person of ordinary skill in the art would reasonably doubt that the asserted utility could be achieved. *Id.* To do so, the PTO must provide evidence or sound scientific reasoning. *See In re Langer*, 503 F.2d 1380, 1391-92 (CCPA 1974). If and only if the Patent Office makes such a showing, the burden shifts to the applicant to provide rebuttal evidence that would convince the person of ordinary skill that there is sufficient proof of utility. *Brana*, 51 F.3d at 1566.

Applicants have demonstrated a "substantial likelihood" of utility by showing a "reasonable correlation" between the utility of the known composition and the composition being claimed. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1565 (Fed. Cir. 1996). The presently claimed ion channel is related to known ion channels. The Office has not provided evidence or sound scientific reasoning that one skilled in the art would doubt the "reasonable correlation" advanced by Applicants.

Additionally, the Office appears to be under the assumption that ***absolute*** certainty is required for an antibody to have a specific utility. The standard applicable in this case is not, however, proof to certainty, but rather proof to reasonable probability. As the Supreme Court stated, applicant need only prove a "substantial likelihood" of utility; certainty is not required. *Brenner v. Manson*, 383 U.S. at 532. Although, there may be numerous inventions that may arise from the present application, this standard does not justify the Office's stance that the present invention lacks a specific utility. Thus, Applicants have complied with the specific utility requirement.

The claimed invention in *Brenner* was directed to a method whose ***only*** utility was making a class of steroids. The disclosure in Brenner failed to disclose a utility for

the products of that method, which in turn led to a § 101 rejection because the products resulting from the method lacked utility. The Applicant admitted that the products produced by the method would not be patentable if they lacked utility. 148 USPQ 696. The Court stated that the method lacked utility as well, holding:

> We find absolutely no warrant for the proposition that although Congress intended that no patent be granted on a chemical compound whose sole "utility" consists of its potential role as an object of use-testing, a different set of rules was meant to apply to the process which yielded the unpatentable product.

148 USPQ 696.

In *Brenner*, the method of making the compounds, which was the only use recited, was inextricably bound up with the compounds themselves and, as a result, the requirement for utility could not be met until a use for the compounds was found. The Court emphasized that the utility of the claimed invention (*i.e.*, the products) would require further research to identify and ascertain, and the compounds produced by the method would be the object of that research.

In contrast, ion channels related to known ion channels stand on a very different basis. As discussed, there are a multitude of utilities for the claimed polypeptides, including their ability to facilitate research.

Applicants further assert that long held pre-Brenner case law standard supports judging the utility of an invention on whether or not the public derives a benefit from the invention, regardless of how slight the benefit. *See,* for example, *In re Nelson*, 280 F.2d 172, 178-180 (C.C.P.A. 1960) (stating that "however slight the advantage which the public have received from the inventor, it offers a sufficient reason for his compensation") (citing ROBINSON ON PATENTS (1890)); *see also Lowell v. Lewis*, 1 Mason 182 (Fed. Case. No. 8568, 1817) (stating "if it be more or less useful is... of no importance to the public. If it be not extensively useful it will silently sink into contempt and disregard"). Polypeptides and antibodies of all types are broadly used in the biotechnology industry, playing key roles in drug and disease discovery processes. Indeed, many such antibodies enable researchers to find the genes associated with

physiological functions. The discovery of such functions readily benefits the public. Accordingly, such tools satisfy the pre-Brenner case law standard.

The Claimed Invention Has A Credible, Specific and Substantial Utility

Applicants also disagree with the Office's allegation that the utilities asserted are not specific or substantial.

The Office alleges that,

> the employment of the antibody of the instant invention for isolation and purification of proteins from cells is not a substantial or specific utility. Any antibody can be employed to detect or purify proteins by the virtue of its binding ability. Such utilities are analogous to the assertion that a particular protein can be employed as a molecular weight marker, which is neither a specific or substantial utility.

(Office Action, page 3). Applicants respectfully point out that the claims are not directed to any antibody, but rather to a particular antibody that binds to an epitope present within SEQ ID NO: 105 (claim 95) or is specific for SEQ ID NO:105 (claim 117). Thus, the antibody of the present invention will not detect or purify any protein, but rather the antibody will bind to a specific protein which comprises an epitope or is specific for SEQ ID NO: 105 (*i.e.* does not bind to another polypeptide). This utility is ***not*** analogous to using a protein as a molecular weight marker as the Office alleges, but rather is specific to particular polypeptides.

The Office also alleges that

> in the absence of knowledge of the biological significance of this polypeptide of SEQ ID NO: 105 or its significance to a particular disease, disorder, or physiological process, which one would wish to manipulate for a desired clinical effect, there is no immediately obvious patentable use for this polypeptide, and consequently for the antibody that binds to an epitope of the polypeptide of SEQ ID NO: 105.

(Office Action, page 3). Applicants respectfully disagree. The Office appears to be under the impression that all patents relating to polypeptides and genes require a recitation of the exact biological significance or provide a link to a specific disease.

However, as discussed above, exact certainty is not required for an invention to have a specific and substantial utility. Proteins are often purified using antibodies raised against a polypeptide before the function of the protein is known or before it is linked to a specific process or disease. The antibodies can be used to identify binding partner to the protein or its localization in the cell to further elucidate the function of the protein beyond what is already known. In the present application, Applicants have demonstrated through the homology of the polypeptide that it is an ion channel. The antibodies of the present invention can be used to identify which compartment the channel is normally expressed (*e.g.* plasma membrane, nucleus, endoplasmic reticulum, etc...) or, as Applicants have previously asserted to identify binding partners or modulators of its activity. A person of skill in the art would readily agree that such uses represent credible, specific, and substantial utilities.

The Office also alleges that, "To grant Applicant a patent encompassing an isolated antibody to a naturally occurring human protein of as yet undetermined biological significance would be to grant Applicant a monopoly 'the metes and bounds' of which 'are not capable of precise delineation'." (Office Action, Pages 3-4). Applicants respectfully disagree.

The pending claims would not grant a monopoly that is not capable of precise delineation. The metes and bound of claims 95, 96, and 117 are clearly defined, and recite an antibody that binds to an epitope on a polypeptide comprising SEQ ID NO: 105, wherein the epitope is present within SEQ ID NO: 105 (claim 95); a monoclonal antibody (claim 96); and an isolated antibody that is specific for SEQ ID NO: 105 (claim 117). The antibody must bind to an epitope that is present within SEQ ID NO: 105 (claim 95), and further is monoclonal (claim 96), or be specific for SEQ ID NO: 105 (claim 117). The scope of the claims is, therefore, precisely delineated and defined.

The Office also alleges that "the invention must be useful in currently available form, which precludes any further experimentation to establish the utility of the claimed invention." (Office Action, page 4). The Office alleges that since Applicants submitted that "some experimentation may be required to practice the claimed invention, such as to

'identify binding ligands and other binding partners", simply confirms that the instant invention was not completed as filed, and, therefore, clearly lacks utility in currently available form." (Office Action, page 4). Applicants respectfully disagree.

The claimed invention ***does not*** require further experimentation to be used. Applicants did not state that further experimentation would be required for the invention to be useful. Rather, Applicants stated in response to the previous Office Action and have discussed herein, that the antibodies of the present invention can be used in other experiments to be used, for example, as a research tool. Using an antibody in other experiments or as a research tool does not mean that the present invention is not useful. Rather, Applicants provided further examples why the present invention has credible, substantial, and specific utilities.

In view of the foregoing, Applicants respectfully requests that the rejection under 35 U.S.C. § 101 be withdrawn.

Rejections under 35 U.S.C. § 112

Claims 95, 96, and 117 remain rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to adequately teach how to use the instant invention. According to the Office, "Since the claimed invention is not supported by either a specific, substantial or credible utility...one skilled in the art clearly would not know how to use the claimed invention." (Office Action, page 5). Applicant respectfully disagrees.

As discussed above, the present invention ***is*** supported by a specific, substantial, and credible asserted utility as well as a well-established utility. Accordingly, Applicant respectfully requests that the rejection be withdrawn.

In view of the foregoing, Applicants respectfully request that the rejection under 35 U.S.C. § 112, first paragraph be withdrawn.

Claim 117 stands rejected under 35 U.S.C. § 112, second paragraph as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office alleges that claim 117 is "vague and

indefinite for the recitation of 'specific for SEQ ID NO: 105'. The metes and bounds of the recitation cannot be determined form [sic] the claim or the instant specification because it is not clear if the specificity is defined by binding to a specific epitope, or to a protein from a particular species, or both." Applicants respectfully disagree.

The term "specific for" is defined in Applicants specification. The specification states, "The term 'specific for,' when used to describe antibodies of the invention, indicates that the variable regions of the antibodies of the invention recognize and bind ion-x polypeptides exclusively." (Specification, page 51). Thus one of skill in the art would understand that the antibody claimed in claim 117 binds "exclusively" to SEQ ID NO:105 and not to any other sequence. Therefore, claim 117 is clear and definite.

In view of the foregoing, Applicants respectfully request that the rejection under 35 U.S.C. § 112, second paragraph be withdrawn.

Rejection under 35 U.S.C. § 103

Claims 96, 96, and 117 remains rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Isenberg *et al.* (Neuroreport, 1993 5:121-124). The Office alleges that "because the amino acid sequence of 5HT3 receptor disclosed by Isenberg et al. comprises an epitope of eight consequent amino acids, which completely mach an epitope of SEQ ID NO: 105, an antibody generated against the sequence, which comprises this epitope, would also bind the polypeptide of SEQ ID NO: 105 of the instant invention. One of ordinary skill in the art would be motivated to generate antibodies against 5HT3 receptor using the entire receptor sequence, which would include the epitope identical to SEQ ID NO: 105." (Office Action, page 6). Applicants respectfully disagree.

As is clear from MPEP §2143, in order to provide a *prima facie* case of obviousness, the Examiner must first establish motivation to combine or modify the references.

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the

> knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

(MPEP §2143).

As the Office previously acknowledged, Isenberg does not disclose an antibody that binds to a fragment of the 5HT3 receptor (Office Action, mailed 1/29/03). Applicants respectfully point out that even if Isenberg did disclose an antibody that binds to the receptor, it would have to be demonstrated that the antibody would also bind to an epitope within SEQ ID NO: 105 for it to anticipate the claimed invention. The Office has failed to identify, in this or any Office Action, an antibody that can bind to the epitope that the Office has identified. The polypeptide discussed in Isenberg has many epitopes and even if one of skill in the art were motivated to generate antibodies against the polypeptide there could be no expectation of success by one of skill in the art that an antibody would be generated that binds to the 8 amino acid sequence and matches the sequence in SEQ ID NO: 105. Without the expectation of success the present claims cannot be obvious to one of skill in the art.

When one of skill in the art generates an antibody "using the entire receptor sequence," as the Office alleges, one of ordinary skilled in the art would be motivated to do, antibodies will be generated to different areas of the receptor. There can be no expectation of success when one uses the entire polypeptide that one will identify an antibody that binds to the specific eight amino acid sequence because there are numerous other epitopes present in the receptor to which antibodies can be generated against. Therefore, the Office has failed to demonstrate a *prima facie* case of obviousness for the pending claims.

Furthermore, even if the Office had shown that claims 95 was obvious, which it has not, the Office has failed to show that claim 117 is also unpatentable in view of Isenberg. As discussed above, claim 117 is directed to an antibody that is specific for SEQ ID NO:105, and that "specific for" means that the antibody binds "exclusively" to

SEQ ID NO: 105. Therefore, an antibody that can bind to another sequence, such as the one discussed in Isenberg, would not be specific for SEQ ID NO: 105. The Isenberg reference fails to teach or even suggest SEQ ID NO:105 or generating antibodies that are "specific for" SEQ ID NO:105. Accordingly, claim 117 is ***not*** obvious in view of the Isenberg reference.

In view of the foregoing, Applicants request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

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Conclusion

Applicants believe the claims are in condition for allowance. An early Notice of Allowance is therefore earnestly solicited. Applicants invite the Examiner to contact the undersigned at (215) 665-6928 to clarify any unresolved issues raised by this response.

Respectfully submitted,

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